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INNOVATION IN AUSTRALIAN MANUFACTURING

The ABS conducted its first survey of the innovative activity of manufacturing businesses in respect of 1993-94. The results were published in **Innovation in Australian Manufacturing** (8116.0). In this article, these results are summarised and some international comparisons are made.

HOW MUCH INNOVATION OCCURS?

The ABS survey showed that one in every three manufacturing businesses in Australia undertook some technological innovation over the period July 1991 to June 1994.

A business was considered to be technologically innovative if during the period it introduced one or more new, or substantially changed, products or if it used new, or substantially changed, processes to manufacture its products.

There are substantial differences across industries and sizes of business in the rate at which technological innovation occurs. Forty six per cent of businesses in the Petroleum, coal, chemical and associated product manufacturing industry were technologically innovative; this industry was the one most technologically innovative, followed by the Machinery and equipment industry (42% of businesses). At the other end of the scale, only 15% of businesses in the Wood and paper product manufacturing industry were innovative. The incidence of innovative activity in all other manufacturing industries was in the 30-37% range. These results are shown in table 18.16.

18.16 Businesses undertaking technological innovation by manufacturing subdivision

Manufacturing subdivision	%
Food, beverages & tobacco mfg	35.6
Textile, clothing, footwear & leather mfg	29.9
Wood & paper product mfg	15.1
Printing, publishing & recorded media	33.5
Petroleum, coal, chemical & associated product mfg	46.4
Non-metallic mineral product mfg	36.7
Metal product	32.0
Machinery & equipment mfg	41.9
Other manufacturing	31.0
Total manufacturing	33.7

Source: Innovation in Australian Manufacturing (8116.0).

On a size basis, not surprisingly the largest firms were the most technologically innovative. Ninety per cent of the manufacturers employing 1,000 employees or more were considered to be innovative. The percentage fell by size of business; 50% of firms with between 20 and 49 employees were innovative. One in four of the smallest firms, employing less than 5 employees,

were innovative in the three year period. These results are show in table 18.17.

18.17 Businesses undertaking technological innovation by employment size

No. of employees	%
Less than 5	25.0
5-9	29.6
10-19	41.3
20-49	50.7
50-99	60.9
100-199	74.8
200-499	81.2
500-999	83.7
1,000 or more	90.3
Total	33.7

Source: Innovation in Australian Manufacturing (8116.0).

HOW INNOVATIVE ARE INDIVIDUAL BUSINESSES?

The above analysis shows that innovative activity is fairly widespread. However it does not answer the question of how much innovative activity each particular innovating business undertook. An insight can be obtained from the share of a firm's income spent on innovative activities. Table 18.18 shows the results of this analysis on both an industry and a size basis.

Interestingly, on average innovating firms spent only 3.6% of their income on their innovative activities. Across industries the proportion ranges from 2.1% to 5.9%. It does not vary greatly by size of business, except for the very smallest businesses, which spend a much greater proportion of their income on innovative activity. This clearly is a reflection of the smaller income of the smallest businesses and the smaller range of activities that they perform. It also reflects the relative newness of the smallest businesses, and the relatively greater importance of expenditure on new activities as part of the process of establishing themselves.

18.18 Innovation intensity of technologically innovative businesses

	Innovation intensity (% of sales)
Employment size	
Less than 5	15
5-9	6
10-19	4
20-49	5
50-99	4
100-199	4
200-499	4
500-999	2
1,000 or more	3
Selected ANZSIC subdivisions	
Food, beverages & tobacco mfg	2
Textile, clothing, footwear & leather mfg	3
Wood & paper product mfg	5
Printing, publishing & recorded media	5
Petroleum, coal, chemical & associated product mfg	3
Non-metallic mineral product mfg	4
Metal product mfg	2
Machinery & equipment mfg	6

Source: Innovation in Australian Manufacturing (8116.0).

ARE AUSTRALIAN BUSINESSES MORE OR LESS INNOVATIVE THAN THEIR OVERSEAS COUNTERPARTS?

There is very little comparative data available, as Innovation surveys are fairly new and data from the latest round of surveys in Europe are not yet available. Data are however available for Norway and Ireland, even if on slightly different bases. Before making any international comparisons one needs to make allowances for these differences. In Norway, the innovation survey excluded manufacturing firms employing less than 5 persons. In the Irish survey the cut-off was businesses employing less than 10 employees. Data are not available to bring these two surveys to the same basis. However, the Australian data can be manipulated to be on a consistent basis with each of them separately. The results of these analyses are shown in table 18.19 (industry) and 18.20 (size) below. The consistency can only be perfectly achieved at the total Manufacturing level, as the industry classifications are slightly different between the countries.

**18.19 Proportion of manufacturing businesses which are innovative in Australia, Norway and Ireland by manufacturing subdivision(a)
(%)**

Manufacturing subdivision	5 or more employees		10 or more employees	
	Australia(b)	Norway	Australia(b)	Ireland
Food, beverages & tobacco	41	37	52	..
Food	..	..	..	21
Drink & tobacco	..	..	..	35
Textile, clothing, footwear & leather	33	..	41	..
Clothing/footwear	32	..	..	..
Textiles, wearing apparel, leather	..	30	..	..
Textiles	..	..	..	36
Wood & paper products	18	..	29	..
Wood products	..	24	..	..
Paper products	..	62	..	..
Wood products, furniture	..	..	..	20
Paper products, printing	..	..	..	26
Printing, publishing & recorded media	42	..	51	(c)
Printing & publishing	..	35	..	(d)
Petroleum, coal, chemical & associated products	55	..	69	..
Chemical, rubber, plastic products	..	66	..	..
Chemicals/pharmaceuticals	..	..	..	45
Non-metallic mineral products	43	..	50	42
Mineral products	..	38	..	..
Metal products	39	36	47	..
Basic metals	..	..	..	..
Basic/fabricated metals	..	..	..	26
Machinery & equipment	54	..	60	..
Machinery	..	52	..	38
Instruments	..	55	..	40
Electrical appliances & supplies	..	57	..	..
Electric/electronic	..	..	..	61
Transport	..	38	..	41
Other manufacturing	39	37	47	..
Furniture	..	38	..	(d)
Total	41	40	51	33

(a) Industry categories align broadly with international standards but have been presented at different levels. (b) Australian data has been recalculated using the size cut-off to allow direct comparison. (c) Included above with Paper products. (d) Included above with Wood products.

Source: Statistics Norway, Norwegian Innovation Survey, 1993; Forfa's, Evaluation and Statistics Unit, Technological Innovation in Irish Manufacturing Industry, Preliminary findings from the Irish Innovation Survey, November 1994; Innovation in Australian Manufacturing (8116.0).

18.20 Proportion of manufacturing businesses which are innovative in Australia, Norway and Ireland, by employment size (%)

No. of employees	Australia(a)	Norway	Ireland
5 or more			
5-9	34	22	..
20-49	51	37	..
50-99	61	50	..
100-199	75	62	..
200 or more	84	79	..
Total	41	40	..
10 or more			
10-49	45	..	26
50-99	61	..	32
100 or more	79	..	60
Total	51	..	33

(a) Australian data has been recalculated using the size cut-off to allow direct comparison.

Source: Statistics Norway, Norwegian Innovation Survey, 1993; Forta's, Evaluation and Statistics Unit, Technological Innovation in Irish Manufacturing Industry, Preliminary findings from the Irish Innovation Survey, November 1994; Innovation in Australian Manufacturing (8116.0).

Compared to manufacturers in Norway, Australian manufacturers have a fairly similar propensity to innovate. The results for most industries seem to be similar. There are however differences by size of business, with a much smaller proportion of small Norwegian businesses considered innovative. The apparent similarity in the totals, despite the differences by business size, reflects the different industrial structures between the two countries.

Compared to manufacturers in Ireland, Australian manufacturers seem to be significantly more innovative. This phenomenon occurs across all industries and all size of business.

From the limited amount of Innovation survey data available, it can be concluded that our manufacturing industry is reasonably innovative when compared to the manufacturing industries of Norway and Ireland. At this time no further international comparisons are possible although more data relating to other countries are expected to become available in early to mid 1996.

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